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| EXAMINER | |
|---|---|
| YANG, MINGHUI | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 2887 | |

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 10/593,754 | SALOMONSEN ET AL. | |
| | Examiner | Art Unit | |
| | MINGHUI YANG | 2887 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *27 May 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *44-85* is/are pending in the application.

4a) Of the above claim(s) *71-85* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *44-70* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *22 September 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *2/21/2007*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election **without** traverse of group I (claims 44-70) in the reply filed on May 27, 2010 is acknowledged.

2. Claims 71-85 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim.

### *Priority*

3. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d) or (f), or 365(a)-(b), to UK applications 0406722.9, 040913.3, and 0413469.8 filed March 25, 2004, April 7, 2004, and June 16, 2004 respectively. Certified copies of the foreign priority application documents have been received in this national stage application from the International Bureau.

### *Information Disclosure Statement*

4. The information disclosure statement filed February 21, 2007 fails to provide English translations of the cited Japanese patent documents. The examiner is aware that English translations of these documents are not readily available to applicants. Therefore, the examiner has considered these documents based on the English abstract and figures provided by applicants and machine translations of these documents obtained from the Japanese Patent Office's website.

### *Claim Rejections - 35 USC § 101*

5. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

6. Claims 60 and 70 are rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter.

Claim 60 recites "*a carrier carrying the processor implementable instructions of claim 58*," while claim 70 recites "*computer program code on a carrier to implement the method of claim 65*." Page 11 of the specifications discloses that a carrier may be "*a data carrier such as an optical or electrical signal carrier*." Since an optical or electrical signal carrier does not appear to be a process, machine, manufacture, or composition of matter, the subject matter of claims 60 and 70 does not fall within a statutory category (See, e.g., *In re Nuitjen*, Docket no. 2006-1371 (Fed. Cir. Sept. 20, 2007) (slip. op. at 18) ("A transitory, propagating signal like Nuitjen's is not a process, machine, manufacture, or composition of matter.' ... Thus, such a signal cannot be patentable subject matter.").

***Claim Rejections - 35 USC § 103***

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

8. **Claims 44, 48-51, 56, 58-60, 65, and 70** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung, US Pg Pub 2002/0077886, in view of Petersen et al, US Pg Pub 2004/0169077.

Regarding claim 44, Chung teaches an electronic voting system (see abstract), comprising:

a voting device configured to generated in response to a voter selection for each of a plurality of voters an encrypted electronic ballot and a printed ballot (the voting device includes at least two independent means for recording and counting votes, see abstract, including an encrypted electronic ballot, see [0046], [0051], and a paper ballot, see [0061]), both having voting selection data indicating the voter's choice (see [0046], [0061]), the electronic ballot including information to link to the printed ballot and the printed ballot including information to link it to the electronic ballot (the voter is associated with a uniquely identifying serial number which may be recorded by both the electronic ballot and the paper ballot, see [0062], [0065]);

an electronic vote decryption system configured to receive the electronic ballots from the voting device and decrypt the electronic ballots including the linking information (a central computer which receives the voting records from the voting machines, see [0049]-[0051]), and;

a voting verification system configured to decrypt voter selection data and linking information from the vote decryption system, to receive voter selection data and linking information from the printed ballots, and to compare voter choices for the printed and electronic ballot linked by the linking information to verify voting (see [0005], [0051]-[0052], [0054]).

However, Chung does not suggest only a sample of the electronic and printed ballots are compared.

Petersen et al teach a combination electronic and paper ballot voting system which records both an electronic and paper version of the vote (see abstract). If a recount is required, an appropriate sample size of paper ballots are selected and then compared to the electronic voting system (see [0368]) to determine a match.

It would have been obvious to one of ordinary skill in the art at the time of invention to compare an appropriate sample size of ballots as taught by Petersen et al when using the electronic voting system of Chung. The motivation would have been to determine if the paper results statistically match the electronic results (see [0368]).

Regarding claim 48, Chung in view of Petersen et al teach the electronic voting system of claim 44 above, but Chung does not suggest sampling the paper and electronic ballots.

Petersen et al teach comparing a sample of paper ballots with electronic ballots to determine if election results are valid (see [0368]). The sample size is determined using Military Standard 105E (see [0450]), which appears to have an initial sample size of 200 if 10,000 votes are cast.

It would have been obvious to one of ordinary skill in the art at the time of invention to compare an appropriate sample size of ballots as taught by Petersen et al when using the electronic voting system of Chung. The motivation would have been to determine if the paper results statistically match the electronic results (see [0368]).

Regarding claim 49, Chung in view of Petersen et al teach determining that all printed ballots carry different linking information (see [0101]-[0102], [0109]) and determining that each printed ballot links to an electronic ballot (see [0109]).

However, Chung does not mention matching the number of printed ballots to the number of electronic ballots.

Petersen et al teach recording the number of ballots cast during voting, and the verifying the number of ballots collected in the hand count matches the electronic ballots (see [0408], [0450]).

It would have been obvious to one of ordinary skill in the art at the time of invention to match the number of paper and electronic ballots as taught by Petersen et al using the voting system of Chung in view of Petersen et al. The motivation would have been to determine if the paper results statistically match the electronic results (see [0368]).

Regarding claim 50, Chung in view of Petersen et al teach the encrypted electronic ballot includes voting district information and comparing the printed and electronic ballots is performed for the district (see [0040], [0062]).

Regarding claim 51, Chung in view of Petersen et al teach the electronic ballot includes voter identification information (see [0040]), and the vote decryption separates voter selection data from voter identification information prior to providing voter selection data to the voting verification system (voter identification information is not provided during vote tabulation to preserve voter anonymity, see [0062], [0071]).

Regarding claim 56, Chung in view of Petersen et al teach processing write in votes (see [0067]).

Regarding claim 58, Chung in view of Petersen et al teach a computer system for verifying the electronic voting system of claim 44 (central computer 12 tabulates and verifies votes from individual voting machines, see [0019], [0045]), comprising:

data memory to store data to be processed (see [0049], [0116]);

program memory storing processor implementable instructions (see [0116], claim 24), and;

a processor coupled to the data and program memory to load and implement the instructions (see claim 24), the instructions comprising:

receiving decrypted voter selection data and linking information from the vote decryption system (see [0049]-[0051]);

receiving voter selection data and linking information from the printed ballots (see [0005], [0051]-[0052]), and;

comparing voter's choices for the printed and electronic ballots linked by the linking information to verify votes (see [0051]-[0052], [0054]).

Regarding claim 59, Chung in view of Petersen et al teach instructions for determining that all printed ballots carry different linking information (see [0101]-[0102], [0109]) and determining that each printed ballot links to an electronic ballot (see [0109]).

However, Chung does not mention matching the number of printed ballots to the number of electronic ballots.

Petersen et al teach recording the number of ballots cast during voting, and the verifying the number of ballots collected in the hand count matches the electronic ballots (see [0408], [0450]).

It would have been obvious to one of ordinary skill in the art at the time of invention to match the number of paper and electronic ballots as taught by Petersen et al using the voting system of Chung in view of Petersen et al. The motivation would have been to determine if the paper results statistically match the electronic results (see [0368]).

Regarding claim 60, Chung in view of Petersen et al teach a computer program to implement the method (see [0043]).

Regarding claim 65, Chung teaches a method of operating an electronic voting system (see abstract), comprising:

collecting a voter from a voter (see [0039]);

outputting vote as both an encrypted electronic ballot and a printed ballot (the vote is recorded using at least two independent means, see abstract, including an encrypted electronic ballot, see [0046], [0051], and a paper ballot, see [0061]), each of the printed and encrypted electronic ballots bearing information linking it to the other (the voter is associated with a uniquely identifying serial number which may be recorded by both the electronic ballot and the paper ballot, see [0062], [0065]);

displaying the printed ballot to the voter (see [0048]);

repeating the previous steps for a plurality of other voters (see [0078]-[0079]);

decrypting and counting the electronic ballots (see [0049]-[0051])

reading voter choices for electronic and printed ballots linked together by the linking information (see [0005], [0051]-[0052]), and;

comparing the voter choices to verify a result of the voting (see [0051]-[0052], [0054]).

However, Chung does not suggest retaining the printed ballots or comparing only a sample of the electronic and printed ballots.

Petersen et al teach a combination electronic and paper ballot voting system which records both an electronic and paper version of the vote (see abstract). Paper ballots are retained to enable the paper ballots to be compared to the electronic records (see abstract, [0050]). If a recount is required, an appropriate sample size of paper ballots are selected and then compared to the electronic voting system (see [0368]) to determine a match.

It would have been obvious to one of ordinary skill in the art at the time of invention to compare an appropriate sample size of ballots as taught by Petersen et al when using the electronic voting system of Chung. The motivation would have been to determine if the paper results statistically match the electronic results (see [0368]).

Regarding claim 70, Chung in view of Petersen et al teach a computer program to implement the method (see [0043]).

9. **Claims 45, 46, 52-55, 61, 62 and 66-69** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chung in view of Petersen et al, and further in view of Chaum, US Pg Pub 2001/0034640.

Regarding claims 45, 46, 61, and 62, Chung in view of Petersen et al teach the voting system of claim 44 above including a ballot printer (see [0036]), but does not suggest ballot boxes for receiving printed ballots.

Chaum teaches a method of voter verification in which paper records of votes are retained in ballot boxes (see [0132]). When a user submits a ballot to be retained for future verification, the ballot or portions of the ballot may be placed in ballot boxes randomly (see [0206], [0222], [0260]).

It would have been obvious to one of ordinary skill in the art at the time of invention to retain ballots in ballot boxes as taught by Chaum when operating the electronic voting system of Chung in view of Petersen et al. The motivation would have been to retain the ballots for future verification (see [0134]).

Regarding claims 52-55, Chung in view of Petersen et al teach the voting system of claim 51 above, but does not suggest shuffling voter selection data and verifying the shuffling using a zero knowledge proof or a homomorphic verification system.

Chaum also teaches an encryption system for ballots which are transferred among multiple recipients each of whom verify some part of the ballot (see abstract). The voter's selection is permuted and encrypted using a secret key (see [0160]-[0161]). The ballots are homomorphically encrypted and re-encrypted (see [0103, [0172]) and verified using a homomorphic verification system (see [0172]). A zero-knowledge proof may also be produced and verified (see [0244]).

It would have been obvious to one of ordinary skill in the art at the time of invention to homomorphically encrypt ballots as taught by Chaum when operating the electronic voting system of Chung in view of Petersen et al. The motivation would have been to protect the voting information and privacy (see [0003]).

Regarding claims 66-69, Chung in view of Petersen et al teach the method of claim 65 above, but does not suggest the ballots are homomorphically encrypted.

Chaum teaches an encryption system for ballots which are transferred among multiple recipients each of whom verify some part of the ballot (see abstract). The ballots are homomorphically encrypted and re-encrypted (see [0103, [0172]) and verified using a homomorphic verification system (see [0172]). The encryption may be performed only partially (see [0125]). A zero-knowledge proof may also be produced and verified (see [0244]).

It would have been obvious to one of ordinary skill in the art at the time of invention to homomorphically encrypt ballots as taught by Chaum when operating the electronic voting system of Chung in view of Petersen et al. The motivation would have been to protect the voting information and privacy (see [0003]).

10. **Claim 47** is rejected under 35 U.S.C. 103(a) as being obvious over Chung in view of Petersen et al, and further in view of Gibbs, Sr., US Pg Pub 2002/0128902.

Chung in view of Petersen et al teach the voting system of claim 44 above, but does not suggest the linking information is printed so it is not directly readable.

Gibbs, Sr. teaches a printer voter ballot receipt as shown in Figs. 1 and 2, which show the front and back of the printed ballot respectively. Voter identification information (personal PIN number 38) is printed on the front side of the ballot as shown in Fig. 1, and voter's choices 50 are printed on the back side of the ballot as shown in Fig. 2. Personal PIN number 38 and voter's choices 50 are not simultaneously visible.

It would have been obvious to one of ordinary skill in the art at the time of invention when using the printed ballot of Chung in view of Petersen et al to print voter information and voting information on separate sides of the ballot so the voter information is not directly visible as taught by Gibbs, Sr. The motivation would have been to prevent ballot selection from being traced back to the voter (see [0026]).

11. **Claim 57** is rejected under 35 U.S.C. 103(a) as being obvious over Chung in view of Petersen et al, and further in view of Chung et al, US Patent 6,973,581.

Chung in view of Petersen et al teach the voting system of claim 44 above, but does not mention using a signer to apply a digital signature to a ballot.

Chung et al teach a method of verifying the identity of a voter using a digital signature (see abstract, col. 6 lines 28-34). The digital signature is verified when the voter provides additional items of voter identification, such as a driver's license, motor vehicle registration, or biometric identifiers (see col. 6 lines 46-51).

It would have been obvious to one of ordinary skill in the art at the time of invention to allow voters to authenticate their ballots using a digital signature verified by other items of voter identification as taught by Chung et al when using the voting system of Chung in view of Petersen et al. The motivation would have been to verify the voter (see col. 4 lines 65-col. 5 line 2).

12. **Claims 63 and 64** are rejected under 35 U.S.C. 103(a) as being obvious over Chung in view of Gibbs, Sr.

Chung teaches a printed ballot for an electronic voting system configured to count electronic ballots corresponding to printed ballots (printing a ballot as one of

multiple independent means for recoding and counting votes, see abstract), the printed ballot bearing information linking the ballot to the electronic ballot (the ballot is printed with a uniquely identifying serial number shared with the electronic ballot, see [0062], [0065]).

However, Chung does not suggest the linking information is printed on the reverse side from the voter choice identification information.

Gibbs, Sr. teaches a printer voter ballot receipt as shown in Figs. 1 and 2, which show the front and back of the printed ballot respectively. Voter identification information (personal PIN number 38) is printed on the front side of the ballot as shown in Fig. 1, and voter's choices 50 are printed on the back side of the ballot as shown in Fig. 2. Personal PIN number 38 and voter's choices 50 are not simultaneously visible.

It would have been obvious to one of ordinary skill in the art at the time of invention when using the printed ballot of Chung to print voter information and voting information on separate sides of the ballot as taught by Gibbs, Sr. The motivation would have been to prevent ballot selection from being traced back to the voter (see [0026]).

***Conclusion***

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MINGHUI YANG whose telephone number is (571)270-3349. The examiner can normally be reached on Mon - Fri 9 AM-5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve S. Paik can be reached on 571-272-2404. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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